REMARKS

Claims 1-6 were pending in the present application. New claims 7-17 have been added by this amendment. Thus claims 1-17 are now pending in the present application. Reconsideration and allowance of the present application in view of the above amendments and the following remarks is respectfully requested.

Claim Rejections – 35 USC § 102

The Examiner has rejected claims 1, 2, and 6 under 35 U.S.C. §102(b) as being allegedly anticipated by United States Patent No. 5,497,668 to Okada ("Okada").

By this response, Applicant has amended claim 1 to recite that "each of the plurality of mono-axial sensors generates an output signal corresponding to the corresponding detected mono-axial mechanical quantity," and that "each of the output signals are summed together to provide a detection signal having an improved signal-to-noise (S/N) ratio." Support for this amendment can be found, for example, in Applicant's FIGs. 6 and 7, and on page 7, lines 8-18, of Applicant's specification. In addition, claim 6, as originally filed, recites that "acceleration signals output from [a plurality of] sensor elements are summed to obtain an output signal maintaining [a] necessary sensitivity."

As shown in FIGs. 6 and 7, a mechanical quantity sensor includes at least two sensor chips 100a, 100b, each having the same characteristics, so that the sensor output is doubled while the noise component remains unchanged. As a result, the signal to noise (S/N) ratio of the final sensor measurement is improved. As further shown by the difference between FIGS. 6 and 7, the two or more sensor chips 100a, 100b may be connected serially or in parallel. As noted, the output for the sensor chips 100a, 100b is generally summed together to get a final sensor output.

In contrast, Okada discloses an apparatus for detecting acceleration that includes a fixed substrate 10 disposed above a flexible substrate 20 within a detector casing 40. A plurality of fixed electrodes 11-15 are disposed on the fixed substrate 10 and a plurality of displacement electrodes 21-25 are disposed on the flexible substrate 20 opposite to the fixed substrate 10. Capacitance elements C1-C5 are defined between respective fixed and displacement electrodes. (See, e.g., Okada, Abstract, column 9, lines 15-30, and FIGs. 1-3.) A working body 30 is then attached to the flexible substrate 20. When a force in the X-axis direction is applied to the working body 30, capacitance elements C1 and C3 will change. (See, e.g., Okada, column 9, lines 33-35, and FIGs. 1-3.)

The Examiner has interpreted each of capacitance elements C1 and C3 to represent mono-axial sensors as recited in claims 1 and 6, a characterization that Applicant disagrees with and respectfully traverses. However, even assuming for the sake of argument that the capacitance elements C1 and C3 did constitute mono-axial sensors, Okada still fails to anticipate claim 6 and amended claim 1 because Okada does not disclose summing the output signals from the capacitance elements C1 and C3. Rather, Okada discloses taking a difference between the associated voltage values of each of capacitance elements C1 and C3. (See, e.g., Okada, column 10, lines 38-40, and FIG. 6.)

Furthermore, as is evident from the bending diagram shown in FIG. 4 of Okada, if the capacitances C1 and C3 were summed, the sum would equal zero, because the displacement of the flexible substrate 20 appears to have an opposite value for each side. (See, e.g., Okada, column 9, lines 24-30, and FIG. 4.)

Therefore, Okada fails to disclose that "each of the output signals are summed together to provide a detection signal having an improved signal-to-noise (S/N) ratio," as recited in amended

claim 1, and that "acceleration signals output from said sensor elements are summed to obtain an output signal maintaining said necessary sensitivity," as recited in claim 6.

Claims 2 depends from claim 1 and is allowable for at least the reasons given above for claim 1.

Based on at least the arguments set forth above, Applicant respectfully submits that claims 1, 2, and 6 are not anticipated by Okada. Applicant therefore requests that the Examiner withdraw the rejection of claims 1, 2, and 6 under 35 U.S.C. §102(b) as being allegedly anticipated by Okada.

Claim Rejections – 35 USC § 103

The Examiner has rejected claims 3-5 under 35 U.S.C. §103(a) as being allegedly unpatentable over Okada in view of United States Patent No. 6,414,381 to Takeda ("Takeda").

Claims 3-5 all depend from claim 1 and are allowable for at least the reasons given above for claim 1. Nothing in Takeda cures the deficiencies in Okada noted above.

Although Takeda does generally disclose stacked and common semiconductor substrate structures (See, e.g., Takeda, FIGs. 3 and 4.), it does not teach or suggest that these structures be applied to a mechanical sensor. Furthermore, nothing in Takeda teaches or suggests summing the outputs of mechanical quantities sensed form two or more mechanical quantity sensors, as discussed above with respect to amended claim 1.

Based on at least the arguments set forth above, Applicant respectfully submits that claims 3-5 are not rendered obvious by Okada. Applicant therefore requests that the Examiner withdraw the rejection of claims 3-5 under 35 U.S.C. §103(a) as being allegedly unpatentable over Okada in view of Takeda.

New Claims

By this response Applicant has added new claims 7-17. Support for these new claims can be found, for example, in Applicant's specification from page 1, line 13, through page 2, line 25, on page 5, lines 16-22, on 7, lines 8-18, and in Applicant's FIGs. 1A, 2A, 6, and 7. No new matter is being added with these new claims.

Conclusion

In view of the foregoing, the Applicant respectfully submits that this application is in condition for allowance. A timely notice to that effect is respectfully requested. If questions relating to patentability remain, the examiner is invited to contact the undersigned by telephone.

Please charge any unforeseen fees that may be due to Deposit Account No. 50-1147.

Respectfully submitted,

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